

# PDG Computing Review

The RPP Database

# Outline

- Overview
- Database table types
- Sample table descriptions
  - The TREE table
  - The MEASUREMENT table
  - The RESULT\_SUMMARY table
- Summary

# Overview

- History
  - RPP database originally punch cards.
    - Some aspects of the current design date back to this period
  - Moved to Oracle in late 1980s
  - Migrated to PostgreSQL last September
- Present system
  - ~60 Oracle equivalent tables
  - 400k rows
  - ASCII dump is 30 Mbytes.

# Database Table Types (I)

- Different database tables serve several functions:
  1. Defining the RPP data structure (4 tables – 26k rows)
  2. Journal references. (9 tables – 75k rows)
  3. Measurements (5 tables – 32k rows)
  4. Footnotes (5 tables – 55k rows)
  5. Tables for generating TeX files ( 7 tables – 30k rows)
  6. Monitoring the book production (7 tables – 12k rows)
  7. Average and fit control ( 6 tables -2500 rows)

# Database Table Types (II)

- 8. Results (2 tables – 10k rows)
- 9. History – results from previous editions  
(2 tables – 150k rows)
- 10. The institutional database (8 tables – 6k rows)
- 11. Miscellaneous tables (4 tables – 1300 rows)
- 12. New tables for the new interfaces (37 tables)

# The TREE table

- Basic structure of RPP database and the book defined in TREE table

The basis of our structure is a series of linked NODES which are defined in the TREE table.

When we produce the book we travel through the tree node by node processing each particle and its associated properties such as masses, lifetimes, and decay modes. Each of these items will have its own node.

# Tree Structure – K+-

<u>NODE</u>	<u>PARENT</u>	<u>CHILD</u>	<u>SIBLING</u>	<u>Ty</u>	<u>DTOT</u>	<u>Cl</u>	<u>CH</u>	<u>PS</u>
s010%								
S010	MXXX020	S010203	S011	B				
S010203	S010		S010205	v				
S010205	S010	S010M	S010210					
S010M	S010205			D M			+	
S010210	S010	S010DM	S010211					
S010DM	S010210			D				
S010211	S010	S010DMAS	S010215		LS			
S010DMAS	S010211			D	LS			
S010215	S010	S010T	S010220					
S010T	S010215			D T			+	
S010220	S010	S010DT	S010221					
S010DT	S010220			D				
S010221	S010	S010W	S010222		LS			
S010W	S010221			D G	LS		+	
S010222	S010	S010CTA	S010223		L			
S010CTA	S010222			D C	L			
S010223	S010		S010225		S			
S010225	S010		S010235	P				
S010235	S010	S010W1	S010240					
S010W1	S010235		S010W2	D				

# TREE table columns (I)

- NODE Unique code representing separate subunits of RPP
  1. highest level subdivides stables, mesons, baryons
  2. next level represents particles
  - 3-5. next levels represents sections, subsections, subsubsections
- PARENT Tree structure for the TREE table.
- CHILD "
- SIBLING "



# TREE table columns (II)

- TYPE Type of node
  - 'B' – Beginning of a particle.
  - 'D' – A datablock
- DATA\_TYPE Type of data in a datablock
  - 'M' – A mass
  - 'D' – A mass difference
  - 'T' – A lifetime

Partial decay modes have a NULL datatype and are described in the DECAY table which I will not describe.

# The MEASUREMENT and RESULT\_SUMMARY tables

- The MEASUREMENT table
  - All measurements are entered in the MEASUREMENT table
- The RESULT\_SUMMARY table
  - Contains results of computations such as fits and averages

# PDG Listing – K Mass



$$I(J^P) = \frac{1}{2}(0^-)$$

NODE=S010

A REVIEW GOES HERE – Check our WWW List of Reviews

NODE=S010203

## $K^\pm$ MASS

NODE=S010205

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
<b>493.677±0.016 OUR FIT</b>	Error includes scale factor of 2.8.			
<b>493.677±0.013 OUR AVERAGE</b>	Error includes scale factor of 2.4. See the ideogram below.			
493.696±0.007	<sup>1</sup> DENISOV	91	CNTR	– Kaonic atoms
493.636±0.011	<sup>2</sup> GALL	88	CNTR	– Kaonic atoms
493.640±0.054	LUM	81	CNTR	– Kaonic atoms
493.670±0.029	BARKOV	79	EMUL	± $e^+e^- \rightarrow K^+K^-$
493.657±0.020	<sup>2</sup> CHENG	75	CNTR	– Kaonic atoms
493.691±0.040	BACKENSTO...	73	CNTR	– Kaonic atoms
• • • We do not use the following data for averages, fits, limits, etc. • • •				
493.631±0.007	GALL	88	CNTR	– $K^-Pb$ (9→8)
493.675±0.026	GALL	88	CNTR	– $K^-Pb$ (11→10)
493.709±0.073	GALL	88	CNTR	– $K^-W$ (9→8)
493.806±0.095	GALL	88	CNTR	– $K^-W$ (11→10)
493.640±0.022±0.008	<sup>3</sup> CHENG	75	CNTR	– $K^-Pb$ (9→8)
493.658±0.019±0.012	<sup>3</sup> CHENG	75	CNTR	– $K^-Pb$ (10→9)
493.638±0.035±0.016	<sup>3</sup> CHENG	75	CNTR	– $K^-Pb$ (11→10)
493.753±0.042±0.021	<sup>3</sup> CHENG	75	CNTR	– $K^-Pb$ (12→11)
493.742±0.081±0.027	<sup>3</sup> CHENG	75	CNTR	– $K^-Pb$ (13→12)

OCCUR=2

OCCUR=3

OCCUR=4

OCCUR=5

OCCUR=2

OCCUR=3

OCCUR=4

OCCUR=5

OCCUR=6

<sup>1</sup>Error increased from 0.0059 based on the error analysis in IVANOV 92.

<sup>2</sup>This value is the authors' combination of all of the separate transitions listed for this paper.

<sup>3</sup>The CHENG 75 values for separate transitions were calculated from their Table 7 transition energies. The first error includes a 20% systematic error in the noncircular contaminant shift. The second error is due to a ±5 eV uncertainty in the theoretical transition energies.

NODE=S010M;LINKAGE=BB

NODE=S010M;LINKAGE=AA

NODE=S010M;LINKAGE=CC

# MEASUREMENT Table columns (I)

- **NODE** - This points to a row in the TREE table that contains a description of the quantity being measured.
- **REFERENCE\_ID** – This points to a row in the REFERENCE table that contains the reference to the paper containing the measurement
- **MEASUREMENT** – The value and errors of the measurement. Usually a value and errors but could be a limit, a range, a special macro, or one of several other items.

# MEASUREMENT Table columns (II)

- VERIFICATION\_ID – a flag indicating whether or not the corresponding authors of the measurement have verified that the measurement data is accurately presented.
- PLACE – How the measurement is used in RPP
  - 'U' – measurement is used in fits and averages
  - 'N' – measurement is not used in fits and averages
  - 'L' – measurement is a best limit. Should be printed with the 'U' measurements in the book.

# RESULT\_SUMMARY table columns

## (I)

- PAR\_CODE – The node of the particle.
- PARAMETER – The node of the particular quantity that was measured
- SUMMARY – The summary value (with errors). Usually a computed value.
- PARTICIPANTS – The number of measurements that participated in the determination of the summary.

# RESULT\_SUMMARY table columns

## (II)

- TYPE - The type of summary:
  - 'AC' – Average computed by average program and automatically put into the database.
  - 'FC' – Constrained fit computed by the fit program and automatically put into the database.
  - 'E' - An estimate chosen by a person based on a knowledge of the measurements being summarized
  - 'L' - A best limit from the measurement table.
- LABEL – For type 'FC', which fit calculated the summary.

# Summary

- Except for the (mini)reviews, the database contains all information needed to produce RPP (plus some conventions/infos encoded into the programs).
- So far we've been able to represent all the scientific information we wanted to publish in this database structure, i.e it is sufficient from the scientific point of view.
- There is no separation between contents and formatting information. The text snippets stored in the database are in TeX format plus a number of TeX macros.